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(54) Title: PROCESS AND SYSTEM FOR SORTING OBJECTS BEARING INSCRIPTIONS, SUCH AS POSTAL OBJECTS, CHECKS AND MONEY ORDERS. (57) Abstract A system for sorting objects, for example postal objects, comprises machines (10) for manipulating the objects and for input and processing of data, computerized servers (14) comprising screen and keyboard consoles (46) and automatic recognition units (44), and user machines (12) comprising means (36) for manipulating objects, means (38) for reading marks and codes, and a sorting unit (40) as well as a data transmission network (16) which interconnects these various means to enable them to function independently of each other and at different times and rhythms. The invention is applicable in particular to postal sorting [see illustration]		

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PROCESS AND SYSTEM FOR SORTING OBJECTS BEARING INSCRIPTIONS SUCH AS POSTAL OBJECTS, CHECKS AND MONEY ORDERS

The invention involves a process and a system for sorting objects bearing handwritten, printed or typed inscriptions, such as for instance postal objects, checks, money orders, bank draft notices, credit card invoices, and, in general, all objects and documents that are the object of sorting on the basis of various criteria.

In general, sorting takes place from the input and interpretation of information borne by the sorted object. In the case of a postal object, the information is made up, on the one hand by a postal code (for the routing sorting) and on the other hand, by the indication of the street name and number (for the distribution sorting). In the case of a check, a money order, a bank transfer notice, etc., the information is made up of the amount and by the name or the account number of the recipient for instance.

Interpretation of this information is performed either by operators, or by automatic recognition and interpretation units.

Several sorting systems are presently used:

- the objects pass in front of work stations controlled by operators, with each operator being able to see the object, read the information looked for, key in the information in question on a keyboard, that is then marked in coded form onto the object, then sorted once or several times by one or several sorting machines equipped with a code or mark reader;
- one after the other, the objects are automatically routed towards a sorting machine and pass in front of the work station of an operator who see

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each object and enters in a code on a keyboard. This code is directly used by the sorting machine to direct the object in the right direction;

- an object handling chain is equipped with an automatic information recognition unit that includes image taking means of the objects and image processing circuits for the automatic information recognition. Objects for which information has been recognized will be sorted directly without marking or else, they are marked to be sorted subsequently;
- an object handling chain is equipped with image taking means of the objects and processing circuits of these images that send the processed images, generally in compressed form, to consoles controlled by operators who read the information looked for and key them in on a keyboard. Eventually, automatic information recognition units can be incorporated into this system.

In spite of their increasing sophistication and the progress in electronics and information technology, the present sorting system through their partial utilization of their capabilities have a poor overall efficiency that leads to over-capacity in terms of equipment and personnel. Indeed, there is no perfect balance between the flows of mechanical means used, those of the automatic information recognition units and those of the operators, since the overall flow of the sorting system is necessarily equal to the slowest of the three flow rates.

Finally, the supplies of sorting systems are not regular throughout the day, in particular in the case of postal sorting, which also forces to oversize the equipment and personnel to be able to absorb traffic peaks.

The purpose of the invention is a process and a

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sorting system that permit avoiding the various inconveniences of the present systems.

Its purpose is a process and a sorting system in which the mechanical components, the computerized means and the operators can work at different speeds and times, without resulting in a slowdown of the overall system.

Its purpose is also a process and a sorting system that permits reducing handling of the objects, even in the case where several items of information must be read at different times for one and the same object.

For that purpose, the invention proposes a sorting process for objects that comprises handwritten, printed or typed inscriptions, such as for instance for postal objects, checks, money orders, with this process consisting in taking images of said objects and their inscriptions, in selecting, processing and compressing information taken from these images, then in reading said information and sorting the objects on the basis of the information read, characterized by the fact that it consists of:

- arranging in parallel several image taking machines and selection, processing and information compression machines, of linking them to a data transmission network and of making them operate independently one from the other;
- linking to the data transmission network computerized servers that comprise information coding and recognition means, storage means for such information, and files;
- linking to the data transmission network several user machines arranged in parallel, of reading on these machines the object codes and of controlling sorting means on the basis of the reading results.

The invention permits as such to organize the sorting of objects in such a way that the three essential operations on which the sorting is based (detection and presentation

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of information, recognition of information, sorting of the objects), take place in this sequence, but through means that function independently one from the other, thanks to the fact that these three operations can be performed at different times and at different locations while being linked by a data transmission network. As such, it becomes possible for each operation, to distribute the work to be done over several machines or units arranged in parallel, without any interference with the execution of other operations.

According to another feature of the invention, this process also consists of forming a main network and secondary data transmission networks and of linking the secondary networks to the main network.

As such, as required, one can distribute the tasks to be performed, then collect the information obtained.

According to another feature of the invention, this process consists also of storing or archiving the abovementioned information as well as the corresponding codes in memories or archiving systems linked to the network.

As such, one reduces the handling of objects, since each time when new information must be read on an object, it suffices to look for the information in the memory, instead of looking for it on the object itself.

The invention also proposes an object sorting system that bears handwritten, printed or types inscriptions such as for instance postal objects, checks, money orders, comprising handling means for these objects, image taking means for these inscription, processing means for these images, reading means for images and object sorting means on the basis of the reading results, with the system being characterized by the fact that it includes:

- machines for inputting information, comprising object handling means,

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image taking means of the objects, selection, processing and compression means for the information taken from these images;

- computerized servers comprising recognition and/or display means for this information, coding means for the objects or their images on the basis of the information recognized or displayed, storage or archiving means of such information and corresponding codes, and computerized files;
- receiving machines, comprising object handling means, means for detecting or reading object codes, and sorting means for these objects;
- and a data transmission network that links among each other the input machines, the servers and the user machines, in such a way that the input machines, servers and user machines can operate for the same objects at different speeds and times, independently one from the other.

Beneficially, the data transmission network includes a main network that can be a telecommunication network and secondary networks that are linked among each other by the main network.

The aforementioned servers include automatic recognition units of this information and assignment of the codes to the objects, and/or display consoles of such information, activated by operators, as well as information files and codes.

One can also provide that the input machines include object marking means placed at the end of the handling means, and sorting means of these objects, that are provided at the end of the handling means and/or marking means.

The invention will be better understood and other

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features, details and advantages hereof will appear more clearly when reading the description that follows, with reference to the drawings attached in which:

figure 1 schematically represents the essential means of a sorting system according to the invention, and their link by a data transmission network;

figure 2 schematically represents an example of a sorting system architecture according to the invention, comprising a main network and secondary data transmission networks.

In what follows, we will describe in detail an example of implementation of the invention, applied to the sorting of postal objects.

However, it is clearly evident that the same means can be applied to the automatic sorting of checks, money orders, bank transfers, credit card invoices, etc. ..., in other words, of any object or document on which information is shown that permits sorting them into at least two categories.

The device schematically represented in figure 1 comprises in essence an input machine 10, a user machine 12, means 14 that will be designated overall as "computerized servers" and a data transmission network 16 to which are linked the input machine 10, the user machine 12 and the servers 14.

The input machine 10 is made up essentially of a chain 18 for handling postal objects (20), an image taking unit 22 for the objects passing by machine 18, with this unit 22 being linked to means 24 that select useful information in the postal object images, means 26 for processing this information, and means 28 for information compression, for which the output is linked to network 16, possibly through a memory buffer.

Image taking unit 22 of a postal object

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provides a digitized video image of this object, more specifically of the face of this object that comprises the information to be recognized, in other words, essentially the address of the recipient.

Means 24, 26, 28 for selecting and processing useful information, then for compressing such information, can for example be of the type described in French patent 2 589 267 and permit among other looking for and keeping useful information, in other words, address lines shown on postal object 20, possibly to check this information, and to compress it through a classic method of the READ coding type or a compression method of information used for faxes, such as for instance of the CCITT group III or IV type.

To reduce even further the volume of information that must be stored in the memory buffers and passed by data transmission network 16, one provides also, by starting from the digitized video image provided by unit 22, that includes for instance 256 levels of grey, for transforming this image into a binary image (with two levels of grey) or into an image that has several levels of grey (for instance 4 or 5), by using for instance the means described in French patent 2 604 582.

Input machine 10 can also include a marking unit 30 for postal objects that is mounted at the end of the handling chain 18 and that will deposit onto each postal object 20 an easily legible mark, for instance a bar code or equivalent signs.

Input machine 10 can also include a sorting unit 32 that has N output points 34, with N being the whole number higher than or equal to 2, with unit 32 thus permitting to make a first sorting of postal objects 20. This unit 32 is provided at the end of marking unit 30, or at the end of the handling chain 18 if no marking unit 30 is provided.

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User machine 12 is essentially made up of a handling chain 36 for postal objects 20; this chain 36 is for instance of the same type as chain 18 of the input machine, of a code detection and/or mark reading unit 38 associated with postal objects 20, and of a postal object sorting unit (4) comprising output points 42 of which the number is comprised between 2 and several hundreds. Sorting unit 40 is located at the end of handling chain 36.

User machine 12 includes a command-control system hooked up to data transmission network 16 and permits commanding the operation of handling chain 36, of the detection and reading unit 38 and of the postal object sorting unit.

Computerized servers 14 comprise essentially automatic information recognition units 44 and screen-keyboard type consoles 46, each activated by an operator. The role of servers 14 is to make other coded information for instance correspond to the recognized information taken from the postal object images that will be used by user machine 12 for sorting postal objects by unit 40.

This other information can be a routing code and a distribution code in the case of postal sorting.

Servers 14 also include digital information archiving means 48 in which are stored on the one hand information taken from the image of each postal object, and on the other hand, codes associated with this information by servers 44 and 46.

One can also provide computerized files 50 that are service files containing useful information for operation of the servers 44 and

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46, for instance distribution codes that coincide with the addresses on the postal envelopes.

Now follows an operation description of the system of figure 1.

Postal objects 20 are loaded onto handling chain 18 of input machine 10 and pass, generally at high speed, in front of image taking means 22. Postal object image 20 is processed by circuits 24 and 26 to provide in the end a binary image or one with several levels of grey of the address appearing on postal object 20, then this address image (that has been checked and reformatted) is compressed by unit 28 and transmitted by network 16 to servers 14.

Each postal object 20 leaving handling chain 18 then passes eventually by marking unit 30 where it receives an appropriate marking, for instance, a routing bar code or a chronological code, then passes eventually by sorting unit 32 that could be commanded by one of servers 44 and 46 and that then guides postal object 20 to one of its output points 34.

The postal address image that is transmitted by compression unit 28 to servers 14 by network 16 can first of all be processed by automatic information recognition unit 44. If this recognition is possible, unit 44 assigns a code to the postal address image of this object and eventually commands marking unit 30 and sorting unit 32 through network 16. The postal image-code association is then stored in archiving unit 48.

When automatic information recognition is not possible, the postal address image is sent to console 46 where an operator can read the address and type corresponding information or codes on the keyboard of his/her console. As before, marking unit 30 and unit 32 of the input machine

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10 are eventually commanded by console 46, and the postal image-code association is stored in archiving unit 48.

Information stored in this unit must permit establishing a logic link between the postal address image of each object and a code or information that may be used subsequently for sorting the object. It is also necessary to establish a logic link between the postal object itself and the address of its image in archiving unit 48. To do so, one can use a postal object passing number in input machine 10 or any other equivalent means that permits identifying postal object 10 by establishing a correspondence between this object and its image stored in unit 48.

Postal objects are then sorted by one or several user machines 12. Their passing in front of code detection unit and/or mark reading unit 38 permits either direct reading of the markings affixed onto the objects and commanding consequently sorting unit 40, or detecting the code or information that establishes a correspondence between the postal object and its image stored in archiving unit 48, to find this image back later on, if need be, and have access to the information or to the code that is associated with it and that is necessary for sorting the object.

“Decentralization” of the processing of information associated with the postal objects permits performing these processes in several steps, so as to limit the traffic points and the size of the sorting systems. These advantages of the invention will be better understood with the following example:

A postal object 20 is mailed in Paris and is going to Marseille. It passes through an input machine 10 that is located in Paris, possibly receives a routing code and/or a correspondence code with

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the image that is affixed onto it by marking unit 30, and passes through sorting unit 32 to leave for Marseille.

The postal address image of this object 20 has been processed by an automatic recognition unit 44 or by a console 46, to determine the routing code and the command possibly of units 30 and 32. The postal address image and a corresponding code of the postal object itself are recorded in an archiving unit 48.

The postal object is then transported to Marseille. During this transport, the image of its postal address can pass again through an automatic recognition unit 44 or a console 46 to determine the distribution code. This distribution code can then be recorded with the postal address image of the object in archiving unit 48.

Upon its arrival in Marseille, the postal object passes through a user machine 12, in which it will be recognized, associated with its distribution code recorded in unit 48 and transmitted to sorting unit 40 that will direct it towards the appropriate output point.

The second processing of the postal address image of the object, that consists in determining the distribution code can, needless to say, be performed at any location of a territory covered by data transmission network 16 and at any time between the first handling of the object in Paris and its second handling in Marseille.

It is obvious, after what is shown above, that data transmission network 16 is destined to link a large number of input machines 10, a large number of receiving machines 12 and a large number of servers 14 among each other, and that it can include for that local networks, local sub-networks, etc.

An example has been represented schematically

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in figure 2, where one sees that local data transmission networks 52 are hooked up to principal network 16 and that these local networks 52 can themselves include sub-networks 54.

Input machines 10, user machines 12 and servers 14 are connected to local networks 52 and sub-networks 54, while the principal data transmission network 16 ensures the link between the local networks.

The principal network 16 can be a telecommunication network for the transmittal of information in batches, while the local networks 52 and the sub-networks 54 can for instance be of the ETHERNET type, capable of transmitted a high flow rate of information (about 10 megabits per second) over a coaxial or two-wire conductor, such as for instance, a telephone pair.

In the event that the invention is applied, no longer for the processing of postal objects but for that of checks, address notions, routing codes and distribution codes will be replaced by the amount of the check, the bank account number of the payer, his name, the name and bank account number of the beneficiary, etc.

In all cases, the invention permits processing objects and documents for sorting, by using input machines, servers and user machines, and a data transmission network that connects among themselves all of the input machines to the servers and to the user machines. As such, one obtains a better fit between the flows of these various means, and a regularization of the maximum and minimum flows. Moreover, one reduces the handling of the objects, because one can work with recorded images of the objects, and not only with the objects themselves.

This results is a considerable improvement of efficiency, as well as savings in equipment and

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in personnel.

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CLAIMS

- 1) An object sorting system bearing handwritten, printed or types inscriptions, such as for instance, postal objects (20), checks, money orders, comprising handling means (18) for these objects, image taking means (22) of said inscriptions, processing means (24, 26, 28) of these images, image reading means and object sorting means on the basis of the reading results, characterized by the fact that it includes:
 - information input machines (10) comprising object handling means (18), image taking means (22) of the objects, means (24, 26, 28) for selecting, processing and compressing information taken from these images,
 - computerized servers (14) comprising recognition and/or display means (44,46) of this information, and the coding of objects or their images on the basis of recognized or displayed information, storage or archiving means (48) of such information and corresponding codes, and files (50);
 - user machines (12) comprising object handling means (36), detection or reading means (38) of code or markings affixed onto the objects, and sorting means (40) for these objects,
 - and a data transmission network (16) linking among each other the input machines (10), servers (14) and user machines (12) so that the input machines, servers and user machines can function with the same objects at different speeds and times, independently one from the other.
- 2) System according to claim 1, characterized

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by the fact that the data transmission network (16) includes a main or principal network and secondary networks (52, 54) linked to main network (16).

- 3) System according to claim 2, characterized by the fact that the main network (16) is a telecommunication network for the transmission of information.
- 4) System according to one of the preceding claims, characterized by the fact that the servers (14) comprise automatic recognition units (44) of such information and assignment of codes to the objects (20).
- 5) System according to one of the preceding claims, characterized by the fact that the servers (14) comprise display consoles (46) of such information, activated by operators.
- 6) System according to one of the preceding claims, characterized by the fact that the servers (14) comprise service files (50) comprising information and codes as well as their correspondence.
- 7) System according to one of the preceding claims, characterized by the fact that the input machines (10) comprise marking means (30) of the objects, located at the end of handling means (18).
- 8) System according to one of the preceding claims characterized by the fact that the input machines (10) comprise sorting means (32) of the objects, located at the end of the handling and/or marking means (30).
- 9) Object sorting process comprising handwritten, printed or typed inscriptions such as for instance postal objects, checks, money orders; this process consists of taking images of said objects and their inscriptions, of selecting, processing and compressing information taken from these images, then of reading such information and sorting the objects on the basis of the information read, characterized by the fact that it consists of:

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- arranging in parallel several image taking, information selection, processing and compression machines (10), of linking them to a data transmission network (16) and of making them operate independently one from the other.
 - linking to the data transmission network (16) computerized servers (14) comprising recognition, coding and storage means (44, 46, 48) of such information, and files (50),
 - linking to the data transmission network several user machines (12) arranged in parallel, to read, on these machines, the codes of the objects, and to command sorting means (40) on the basis of the reading results.
- 10) Process according to claim 9, characterized by the fact that it consists of forming a principal network (16) and secondary data transmission networks (52, 54) and of linking the secondary networks (52, 54) to the principal network (16).
- 11) Process according to claim 9 or 10, characterized by the fact that it consists of storing or archiving the above information as well as their codes in archiving units (48) linked to the network (16).
- 12) Process according to one of claims 9 to 11, characterized by the fact that it consists of establishing corresponding files (50) between information and codes, and of using them to assign codes to the information associated with said objects.

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TRANSLATOR CERTIFICATION

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I, Jean Pierre Vandenbrande, a translator fluent in the French language, on behalf of Morningside Evaluations and Consulting, do solemnly and sincerely declare that the following is, to the best of my knowledge and belief, a true and correct translation of the document(s) listed below in a form that best reflects the intention and meaning of the original text.

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J. P. Vandenbrande / jr
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